Epidemiology
Open Access

Castro et al., Epidemiol 2013, 4:1
DOI: 10.4172/2161-1165.1000142

Research Article Open Access

# An Educational Intervention with Hispanic HIV Infected Patients: A Randomized Study

**Jose G Castro**[1]*, **Drenna Waldrop-Valverde**[2] **and Eduardo E Valverde**[3]

[1]*Department of Medicine, University of Miami Miller School of Medicine, Miami, Florida 33136, USA*
[2]*Associate Professor, Nell Hodgson Woodruff School of Nursing, Emory University, 1520 Clifton Road NE, Atlanta, GA 30322, USA*
[3]*Epidemiologist, Behavioral and Clinical Surveillance Branch, Division of HIV/AIDS Prevention, Centers for Disease Control and Prevention, 1600 Clifton Road, Atlanta, Georgia 30322, USA*

## Abstract

**Background:** Patient's knowledge of their disease has been associated with better ART adherence however, little is known on the effects of increased knowledge on health outcomes in Hispanics. We tested the ability of a structured, culturally sensitive Educational Intervention (EI) to improve HIV knowledge and clinical outcomes of Hispanic HIV patients.

**Methods:** 400 Hispanic HIV positive patients were enrolled from HIV clinics in Miami; FL. Patients were randomized to a Standard of Care (SOC) HIV management and SOC plus the EI. The EI consisted of 3 two-hour modules delivered over 12 weeks. HIV knowledge and CD4 cell counts were assessed at baseline and 6 months post-baseline.

**Results:** Repeated measures analysis of covariance, adjusted for education and employment, indicated a significant interaction between the intervention and HIV knowledge at 6 months post-intervention [$p<0.001$] and showed that the intervention group had significantly higher knowledge scores than the control group post-intervention. Multivariate analysis, adjusted for antiretroviral use, showed a significant interaction between the intervention and CD4 cell counts [$p<0.03$] suggesting that CD4 counts increased at a significantly greater rate at 6-month follow-up for those in the intervention group. Post-intervention HIV knowledge was significantly related to post-intervention CD4 counts [$p<0.05$].

**Discussion:** These findings indicate that a culturally tailored intervention to increase HIV knowledge for Hispanic HIV patients successfully improved HIV knowledge and may be related to improved rates of CD4 increases over time. The sustainability of these improvements over time for this population needs further study.

**Keywords:** HIV; AIDS; Hispanics; Educational

## Introduction

Dramatic declines in deaths and incidence of opportunistic diseases attributed to human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) have been observed since potent antiretroviral therapy first became available in late 1995 [1-3]. Declines in the number of deaths began simultaneously in all demographic groups; however mortality rates have varied by gender, race/ethnicity, and transmission category [4-6]. Another important characteristic of the HIV epidemic in the U.S. has been its progressively growing impact in ethnic minorities. The United States has a large and growing Hispanic population that has been disproportionally affected by the HIV/AIDS epidemic [3]. In 2001, Latinos represented 13.4 percent of the U.S. population, but they accounted for 20 percent of the total number of reported U.S. AIDS cases. HIV was the 6th leading cause of death for Latino men and 5th for Latinas, aged 25-44, in 2004 [4]. HIV death rates per 100,000 among those aged 25-44, were higher among Latinos (9.3 for men and 3.1 for Latinas) than whites, although they were highest for Blacks [5].

The disproportionate impact of HIV/AIDS in Hispanics and their unique cultural characteristics underscore the importance of implementing and sustaining effective preventive and therapeutic interventions for this population [7-9]. These interventions should take into consideration unique underlying characteristics observed in the Hispanic community, such as language and/or cultural barriers. Patients' knowledge of their disease and their medications has been associated with better ART adherence, and the effect of health literacy on HIV knowledge has been extensively studied [10-12]. However, little research in this area has been conducted exclusively in HIV-infected Hispanics, and little is known about the effects of increased knowledge on health outcomes in Hispanics to date. The objective of this study was to assess the clinical and demographic characteristics of a large group of Hispanic HIV positive patients in two clinics in Miami and to test the ability of a structured, culturally sensitive educational intervention to improve their HIV knowledge and some clinical outcomes 6 months after the initial evaluation.

## Methods

### Participants and settings

A total of 400 HIV positive Hispanic patients were recruited for this study from the University of Miami AIDS Clinical Research Unit (ACRU) and the Jackson Memorial Hospital (JMH) outpatient HIV clinic in Miami, FL. ACRU is primarily a research clinic, but it also maintains a primary care clinic for patients who have previously participated in a clinical research study or are currently participating in one and have no primary care provider. JMH is the county hospital in Miami-Dade and maintains an HIV clinic that serves primarily Ryan-White and Medicaid patients. These clinics are fully staffed with experienced providers and patients have access to specialized services such as clinical pharmacy, case management, mental health and social work services. These combined clinics constitute the largest facility providing care and treatment for individuals with HIV/AIDS in Miami-Dade County.

---

***Corresponding author:** Jose G Castro, Department of Medicine, University of Miami Miller School of Medicine, Miami, Florida 33136, USA, Tel: 305-243-4000; E-mail: jcastro2@med.miami.edu

**Received** November 05, 2013; **Accepted** December 19, 2013; **Published** December 21, 2013

**Citation:** Castro JG, Waldrop-Valverde D, Valverde EE (2013) An Educational Intervention with Hispanic HIV Infected Patients: A Randomized Study. Epidemiol 4: 142. doi:10.4172/2161-1165.1000142

Study staff informed medical providers from both clinics about the objectives of the study and referral procedures. Medical providers were asked to refer potential participants to study staff for assessment. The criteria to participate in the study included: documentation of HIV infection, self described as Hispanic, 18 years or older, intention to remain in the city for the next six months and ability to understand and sign informed consent. All study procedures were done in a private room in a building located within walking distance from both clinics.

## Design

This study used a randomized (1 to 1) parallel design. Interested individuals who met all the inclusion criteria were asked to read and sign the Informed Consent if they agreed with study objectives and procedures. After signing the IC, participants had the baseline assessment (Demographic and knowledge questionnaires). Upon completion of this assessment, participants were randomized (simple randomization) to the Structured Education (SE) or to the Standard of Care (SC) group. A computer-generated random numbers table was used to assign participants to both groups. Participants assigned to the SE group received the intervention that consisted of three 2-hour modules given every four weeks. Educational sessions were given in the language of choice of the participant, individually or to small groups. The final assessment was scheduled 6 months (plus minus 2 weeks) after baseline evaluation.

Participants who were randomized to the SC group received standard of care services provided to all HIV positive patients seen in these clinics, including any other educational activity offered as part of "regular" care provided to HIV infected patients in the community.

## Intervention

The intervention was grounded in the Health Belief Model, which holds that to effect changes in behavior, individuals must

(1) Attain a certain level of relevant health knowledge, (2) perceive their own vulnerability to a serious health risk, (3) be convinced that changing their behavior will be beneficial to reducing their susceptibility to the health risk, and (4) believe that the benefits of taking action outweigh any risks or drawbacks [13]. The limited knowledge about mechanisms of HIV/AIDS transmission and misconceptions about who is at risk displayed by the target population suggested that basic educational information would assist them in accurately assessing their personal risk for treatment failure. The intervention was administered by the study coordinator, who was Hispanic of Cuban descent and was developed with input from Hispanic clinic staff that has been providing HIV care and social services for more than 15 years. These sessions were structured and reproducible and were interactive and included didactic materials presented in Spanish or English. The information was presented at a grade 9 level of comprehension and included graphics and expressions commonly used in Spanish. All the graphics displayed known Hispanic symbols and all the presentations were given in power point presentation shown in a portable computer. A brief description of the three education sessions and their objectives is provided below.

**Session 1:** HIV Care basics, this session started with a description of the goals and objectives of the program. Then participants received basic information about HIV, AIDS, HIV testing, natural history of HIV infection and HIV transmission.

**Session 2:** HIV treatments, this session started with a brief review of the concepts discussed in session 1. Then participants received information about opportunistic infections and the most common laboratory tests use in HIV care. Finally, there was a discussion about the importance of the involvement of the patients in their own care.

**Session 3:** Antiretroviral therapy basics, this session started with a brief review of the concepts discussed in session 2. Then participants received information about antiretroviral therapy, side effects of medications and the importance of adherence to medications.

## Instruments

**HIV Knowledge:** This questionnaire is one of several instruments developed as part of a project supported by the Division of Adolescent and School Health, Centers for Disease Control (CDC). During 1989-1992, these assessment instruments were developed by lOX Assessment Associates with the continuing collaboration of CDC personnel. The instruments were field-tested with small groups of students, and then revised on the basis of students' reactions to directions, items, and vocabulary. The revised instruments were field-tested again, revised, and reviewed by individuals engaged in the evaluation of HIV education programs. In particular, we used the "Knowing about HIV and AIDS" instrument that is a 15-item questionnaire that measures the accuracy of the subjects' knowledge about HIV and AIDS. The test is offered in two versions that have comparable content. We used one in the baseline evaluation and the second in the final one. Scores on this measure range from 0-15.

**HIV-disease outcomes:** We obtained the absolute CD4 cell count value from the medical record. The information was collected in two time points. The "Baseline CD4" (most recent CD4 cell count prior to baseline evaluation). The "Final CD4" (first CD4 cell count measured after the final visit).

Statistical analysis- Pearson and Spearman correlation analyses were performed as appropriate to assess the relation of demographic variables to study outcomes. T-tests and chi-square analyses were also conducted as appropriate to test group differences. Study hypotheses were evaluated using repeated measures analysis of covariance, adjusted for relevant demographic characteristic.

## Results

Four hundred participants were enrolled in the study with a retention rate of 90% at the end of the study. Most of the participants (65%) reported unprotected heterosexual sex as their risk factor for the acquisition of HIV infection. Women make up 24% of the sample and 65% of the participants reported having sex with the opposite gender (97% of the participants reporting sex with the same gender were men). Most of participants (83%) were taking antiretroviral therapy. Additional demographic characteristics of participants are described in Table 1.

Demographic characteristics and use of antiretroviral medications at baseline were tested for their relationship to HIV knowledge at the final visit. Those significantly related at $p<0.05$ were included as covariates in analyses. Of the demographic characteristics, only education (dichotomized into high school and above versus less than high school) and being employed (yes/no) at baseline were significantly related to HIV knowledge at the final visit. Use of antiretrovirals was also unrelated to HIV knowledge at the final visit.

To test the effects of the intervention on changes in HIV knowledge (measured using the CDC knowledge scale), a repeated measures analysis of covariance was used. The within subjects effect was HIV knowledge and the between subjects effect was randomization to the

| Domain | Number | Percentage |
|---|---|---|
| **Gender** | | |
| Male | 303 | 76% |
| Female | 97 | 24% |
| **Country of Origin** | | |
| USA | 19 | 5% |
| Foreign | 381 | 95% |
| **Education** | | |
| Completed High School or more | 241 | 60% |
| Less than completed High School | 159 | 40% |
| **Sexual Orientation: Preference for** | | |
| Opposite gender | 259 | 65% |
| Same gender | 123 | 31% |
| Both genders | 16 | 4% |

**Table 1:** Demographic characteristics of study participants.

intervention. Analysis was adjusted for high school education and employment.

Multivariate results indicated a significant interaction between randomization to the intervention and HIV knowledge at 6 months post-intervention [F=26.85, $p<0.001$] and showed that the intervention group had significantly higher knowledge scores than the control group post-intervention. Having a high school education was also related to increased post-intervention HIV knowledge ($p<0.001$).

Post-intervention scores of the treatment group increased from an average of 11.83 to an average of 12.44 whereas those of the control group actually declined (11.66 to 10.81).

The second repeated measures analysis of covariance measured the effects of the intervention on changes in CD4 cell count. After adjusting for antiretroviral medication use, multivariate results showed a significant interaction between the intervention and CD4 cell counts [F=5.10, $p<0.03$] suggesting that CD4 counts increased at a significantly greater rate at the final visit for those in the intervention group, although mean CD4 levels did not differ statistically. Antiretroviral use was not associated with CD4 cell counts [F=.808, $p=0.369$]. Post-intervention HIV knowledge was significantly related to post-intervention CD4 counts [F=1.97, $p<0.05$].

## Discussion

This was a randomized study that evaluated the impact of an educational intervention to improve HIV knowledge and clinical outcomes in a sample of HIV positive Hispanic patients in Florida. This sample of Hispanic patients included people from many nationalities but the Cuban heritage was the most common. It has a relatively higher representation of women compared to most cohorts described in the United States. Most of the participants thought they acquired HIV by sex (heterosexual) and report infrequent use of illegal drugs. Those who completed the educational intervention showed improved HIV knowledge and a greater rate of improvement in CD4 cell counts over the six month follow-up period than control participants. These findings are concordant with a smaller but similar study by Van Servellen et al. [14] that used an "Adherence Enhancement Program" to improve the 6-month measures of HIV health literacy, perception of the quality and communication with HIV-treating physicians, and rates of undetectable HIV viral load in the intervention group.

Our large, randomized study provides additional evidence for the efficacy of culturally sensitive interventions to improve HIV-disease knowledge. This increased knowledge can lead to improved adherence and HIV-disease parameters. Similar findings were also reported in a recently published study done in Miami but in a predominantly African American sample [15]. Our study findings also indicate that HIV-infected Hispanic patients with less than a high school education are at a higher risk of poor treatment outcomes. If this finding is replicated in other studies, absence of high school education could be use as a marker to facilitate additional resources. A larger study conducted in recipients of Ryan White care in Miami found similar rates of (35%) individuals with less than high school education and would suggest that absence of high school education in HIV infected individuals may not be limited to Hispanic patients [16]. Related findings from other studies have found an association between lower literacy and lower HIV treatment adherence and knowledge in HIV infected patients [17-19] including knowledge of relevant disease parameters [20,21]. These findings along with those of the present study imply that low literacy, a commons equelae of limited or poor quality education, is a barrier to adequate HIV knowledge. However a longitudinal study by Paasche-Orlow et al. [10] reported no association between literacy and adherence or virological control. Therefore, more research is needed to better elucidate the affect of poor education and low literacy on disease knowledge, management and outcomes in HIV infection. The present findings in Hispanic HIV patients show that this population which is disproportionately affected by HIV, can benefit from targeted, culturally relevant educational intervention.

Gender was unrelated to study outcomes suggesting that this educational intervention was equally successful for both Hispanic men and Hispanic women. However, the relatively large number of women in this study is an important characteristic given the limited representation of Hispanic women in almost all HIV-related studies. Future interventions with HIV positive Hispanics that include a sexual risk reduction component may need to be adapted separately by gender but was not a focus of the present study.

Several limitations with this study are worth noting. The primary aim was to improve HIV knowledge, which included conveying the importance of medication adherence. The direct effect of such knowledge on CD4 counts was then tested. The significantly greater rate of increase of CD4 cell counts in the intervention group was thus assumed to be a function of better medication adherence, learned through the intervention. However, this assumption was not directly measured in this study. Moreover, only individuals interested in completing the HIV related education intervention were enrolled which may have resulted in selection bias. Use of the control condition suggests that the intervention was, in fact, effective in improving HIV knowledge and improved increases in CD4 cell counts. However, since we did not employ an attention control condition, it is not possible to ascertain the effect of the relationship between the interventionist and patients on study outcomes, above those seen from the information conveyed. Furthermore, we did not control for the congruence of the HIV provider and patient and whether a provider of similar ethnicity who also speaks Spanish may have impacted study outcomes. We did not use HIV RNA viral load as one of the end-points of the study. The study team choose not to include it because there were concerns about availability of enough data in the two time points for all participants. Participants were also not excluded from participating in other educational opportunities which were also uncontrolled in this study. Lastly, the majority of participants in this study were Cuban Americans and it is unclear if these findings can be applied directly to other groups of Hispanics, such as Mexicans, that are the predominant group in many other areas of the country.

Despite these shortcomings, this study provides evidence that a culturally relevant HIV education intervention for Hispanic HIV positive men and women was successful in improving HIV knowledge and rates of increase in CD4 cell counts over the six-month study period. With the increasing and disproportionate rates of HIV infection among Hispanic Americans, such studies are crucial for learning how to manage the consequences of this infection among this vulnerable population. This study also provides opportunity for future studies to evaluate the long-term effects of the intervention and whether and when booster intervention sessions may help to sustain positive effects. Whether the intervention is transferrable to Hispanic HIV patients from different nationalities would also be of interest. It would also be of interest to determine its applicability and effectiveness in a group rather than individual format. The cost savings associated with this intervention, with whom it may be most effective (low literate, less educated) and in what format (group versus individual) are all essential to determine the most widely effective intervention for Hispanic American HIV patients in improving HIV knowledge, management and disease outcomes.

## Acknowledgment

This study was supported by a grant from the Center of Medicare and Medicaidto Support the Hispanic Health Services ResearchProgram.

## References

1. Lee LM, Karon JM, Selik R, Neal JJ, Fleming PL (2001) Survival after AIDS diagnosis in adolescents and adults during the treatment era, United States, 1984-1997. JAMA 285: 1308-1315.
2. Palella FJ Jr, Delaney KM, Moorman AC, Loveless MO, Fuhrer J, et al. (1998) Declining morbidity and mortality among patients with advanced human immunodeficiency virus infection. HIV Outpatient Study Investigators. N Engl J Med 338: 853-860.
3. Joint United Nations Programme on HIV/AIDS (2011) Progress Report Summary 2011: Global HIV/AIDS Response.
4. Centers for Disease Control and Prevention (2007) HIV/AIDS Surveillance Report 2005. Atlanta: US Department of Health and Human Services.
5. CDC (2013) Monitoring selected national HIV prevention and care objectives by using HIV surveillance data- United States and 6 U.S. dependent areas-2011. HIV Surveillance Supplemental Report 2013.
6. CDC (2012) Estimated HIV incidence in the United States, 2007-2010. HIV Surveillance Supplemental Report 2012.
7. Hirsch JS, Higgins J, Bentley ME, Nathanson CA (2002) The social constructions of sexuality: marital infidelity and sexually transmitted disease-HIV risk in a Mexican migrant community. Am J Public Health 92: 1227-1237.
8. González-López G (2006) Heterosexual fronteras: immigrant Mexicanos, sexual vulnerabilities, and survival. Sex Res Soc Pol 3: 67-81.
9. Muñoz-Laboy M, Hirsch JS, Quispe-Lazaro A (2009) Loneliness as a sexual risk factor for male Mexican migrant workers. Am J Public Health 99: 802-810.
10. Paasche-Orlow MK, Cheng DM, Palepu A, Meli S, Faver V et al. (2006) Health Literacy, Antiretroviral Adherence, and HIV-RNA Suppression: A Longitudinal Perspective. J Gen Intern Med 21: 835-840.
11. Miller LG, Liu H, Hays RD, Golin CE, Ye Z, et al. (2003) Knowledge of antiretroviral regimen dosing and adherence: a longitudinal study. Clin Infect Dis 36: 514-518.
12. Kalichman SC, Ramachandran B, Catz S (1999) Adherence to combination antiretroviral therapies in HIV patients of low health literacy. J Gen Intern Med 14: 267-273.
13. Rosenstock IM, Strecher VJ, Becker MH (1994) The health belief model and HIV risk behavior change. In: DiClemente RJ, Peterson JL (Eds.), Preventing AIDS: Theories and Methods of Behavioral Interventions. NY: Plenum Press, New York.
14. van Servellen G, Nyamathi A, Carpio F, Pearce D, Garcia-Teague L, et al. (2005) Effects of a treatment adherence enhancement program on health literacy, patient-provider relationships, and adherence to HAART among low-income HIV positive Spanish speaking Latinos. AIDS Patient care and STDs 19: 745-759.
15. Jones D, Cook R, Rodriguez A, Waldrop-Valverde D (2013) Personal HIV knowledge, appointment adherence and HIV outcomes. AIDS Behav 17: 242-249.
16. Moss A, Brock-Getz P, Ladner R and Fiano T (2012) The relationship between health literacy, knowledge of health status, and beliefs about HIV/AIDS transmission among Ryan White clients in Miami. Health Education Journal 72: 292-299.
17. Wolf MS, Davis TC, Osborn CY, Skripkauskas S, Bennett CL, et al. (2007) Literacy, self-efficacy, and HIV medication adherence. Patient Educ Couns 65: 253-260.
18. Weiss L, French T, Finkelstein R, Waters M, Mukherjee R, et al. (2003) HIV-related knowledge and adherence to HAART. AIDS Care 15: 673-679.
19. Kalichman SC, Benotsch E, Suarez T, Catz S, Miller J, et al. (2000) Health literacy and health-related knowledge among persons living with HIV/AIDS. Am J Prev Med 18: 325-331.
20. Wolf MS, Davis TC, Arozullah A, Penn R, Arnold C, et al. (2005) Relation between literacy and HIV treatment knowledge among patients on HAART regimens. AIDS Care 17: 863-873.
21. Nicholson O, Mellins C, Dolezal C, Brackis-Cott E, Abrams EJ (2006) HIV treatment-related knowledge and self-efficacy among caregivers of HIV-infected children. Patient Educ Couns 61: 405-410.